

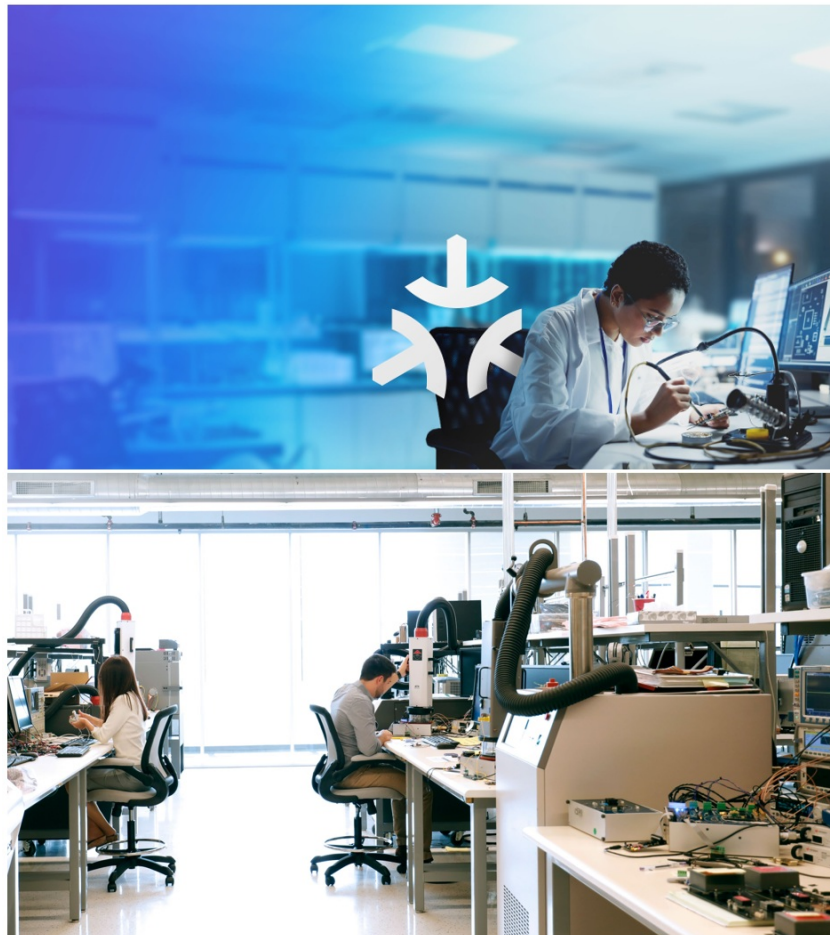


## SILLICON LABS Matter SoC and Module Instructions

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Matter SoC and Module  
Selector Guide  
Selecting the Right Matter  
Device for Your Applications



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## How Silicon Labs' Portfolio is Ideal for Matter Development



### Hardware

Single-SoC Matter solutions

- High-performance RF enables reliable connectivity in every room of the house and beyond
- Ultra-low-power — Extend battery life and recharging interval
- Fully integrated MCU — Simplify product design, reduce BoM costs, improve profits
- RF-Certified Modules — Accelerate time-to-market by up to 9 months



### Software

Pre-certified and tested Matter, Wi-Fi, Thread, and Bluetooth software

- Pre-certified and tested Matter, Wi-Fi, Thread, and Bluetooth software
- Full compliance and maximum performance on Silicon Labs hardware
- Reduce time and costs of development and certification
- Improve product quality
- The best SDK support with 10 years of longevity



### Security

Fully Matter-compliant security

- Secure Vault covers all mandatory, recommended, and optional security requirements
- PSIRT offers constant monitoring and rectification of vulnerabilities (Matter requirement)
- MG24 — The highest PSA Level 3 certification
- SiWx917 — The best-in-class IoT security in Wi-Fi

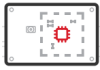


### Secure Programming

Securely program Matter certificates, security settings, keys, and flash software

- Prevent counterfeiting and IP theft
- Simplify the creation of Matter QR codes
- Reduce manufacturing risks and costs

- Accelerate production time



### **Developer Journey**

Most comprehensive end-to-end guide for Matter

- Reduces your Matter learning curve to get you to market faster
- Step by step guide from learning to production
- Includes information on Ecosystems steps along the journey
- Provides guidance on hardware including ICs, Modules, and development hardware

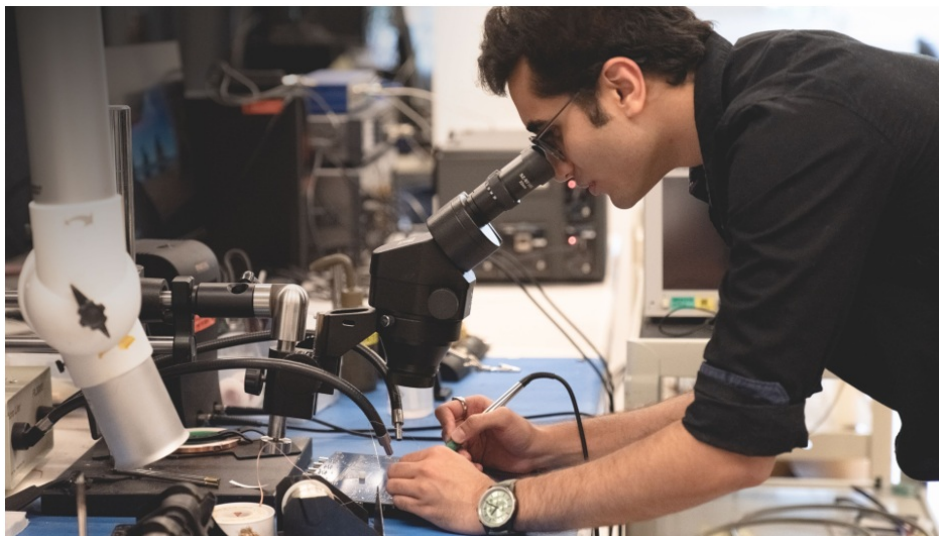


### **Most Complete**

Most Complete Go-to-Market Solution for Matter

- Enhance user experience with high-performance wireless and ultra-low-power
- Matter-compliant security to protect devices, users, and brand reputation
- Develop faster and reduce costs with community support 24/7, developer journeys, and documentation

## **Wireless Hardware for Matter**



### **Performance**

Improve overall product quality, enhance user experience, reduce warranty returns, and minimize support costs through reliable wireless connectivity in every room of the house (and beyond)



### **Battery Life**

Score better on product reviews and enhance user experience with extended battery life and improved recharging intervals on your devices



### **Security**

Stay protected with the industry's most advanced IoT security solution, Secure Vault, which is fully compliant with the Matter specification



### **Costs & Simplicity**

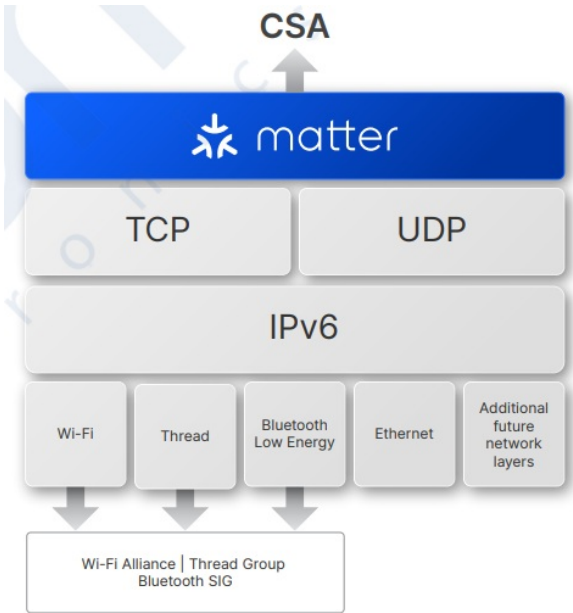
Simplify product designs, reduce BoM costs, and improve your profits using Silicon Labs Matter solutions based on single chip SoCs and modules





Pre-Certified Wireless Software for Matter

Our SDKs provide pre-certified and tested wireless protocol stacks for Wi-Fi, Thread, Bluetooth LE, and Matter application layer firmware. Silicon Labs wireless protocol stacks are tested and quality assured for full compliance, stability, and maximum performance to:

		
Increase overall product quality	Reduce development time and costs	Ensure that devices can pass final certifications on the first go

TESTED & PRE-CERTIFIED SOFTWARE



Matter Security Solutions	 <b>Fully Compliant</b> Secure Vault, PSIRT, and CPMS provide the functions needed to cover all mandatory, recommended, and optional security requirements of the Matter specification in one package	 <b>Most Advanced</b> Featuring advanced IoT security solutions, our MG24 supports the highest P3 certification and SiWx917 features the IoT security	 <b>Always Up-to-Date</b> Continuously monitor or vulnerabilities and receive timely security updates. With us, you get the best support service in the industry, with up to 10 years of longevity for software and security	 <b>Programmable</b> Safely program Matter certificates, keys, security settings, applications, and bootloaders on wireless SoCs to reduce risks, save costs, and accelerate production
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<b>Secure Programming</b>	 <b>Ready to Ship</b> With CPMS, securely program all Matter certificates, security settings, keys, applications, and bootloaders. Onboarding Payload is provided for the QR code, so Matter products are ready to ship	 <b>Accelerate Production</b> Instead of separate programming and flashing (in-house/CM), Silicon Labs programs SoCs during production and can deliver Matter-related programming as part of the process; reduces risk, cost, and time-to-market	 <b>Reduce Risks</b> Wireless SoCs are delivered to the CM secured and programmed with an encrypted SW image, preventing counterfeiting and IP theft	 <b>Maximize Security</b> Achieve maximum protection with Silicon Labs Secure Vault, which is broadly recognized as the most advanced IoT security solution and is fully compliant with the Matter specification
<b>Most Complete Matter Development Solution</b>	 <b>Learn in Advance</b> Access the most comprehensive Matter developer journeys for popular ecosystems like Google, Amazon, Apple, and SmartThings; these journeys help development teams learn the entire process in advance to avoid common mistakes and plan resources wisely	 <b>Kits for all Use-cases</b> Leverage development kits for all Matter use cases: Matter over Wi-Fi, Matter over Thread, Border Router, Matter Bridge, and more	 <b>Tools for all skill levels</b> No Code to Pro Code, our Simplicity Studio can meet the demands of an RF specialist with no embedded code experience to a team of embedded developer	 <b>Advanced Development</b> Key features like our Packet Trace Interface for advanced network debug is critical for mesh networks like Matter over Thread, while our Energy Profiler can help deliver the lower power solution, extending battery life of both our Matter over Thread and Matter over Wi-Fi solutions

### High-Performance, Low-Power Wireless SoCs for Thread and Wi-Fi

- Lowest power on the market for Wi-Fi
- Industry-leading wireless characteristics (TX power, RX sensitivity, etc.)
- Single-SoC Matter solutions with Bluetooth LE co-existence
- Integrated wireless MCUs with many add-ons: AI/ML, Sensor Hub, high-accuracy ADC, etc.
- Most advanced security with PSA Level 3 certification for Matter, Thread, Bluetooth LE

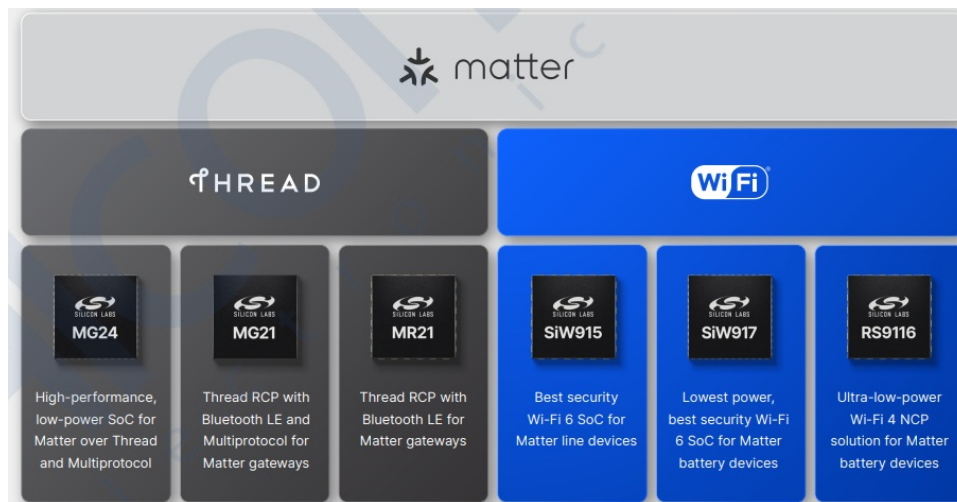
One of the first design considerations you'll encounter is what networking technologies best fit your application. Based on this, you then can decide if your project is best suited for a System-on-Chip (SOC) paradigm or a Network Coprocessor (NCP) paradigm and, for the NCP, what kind of serial communication to use for controlling



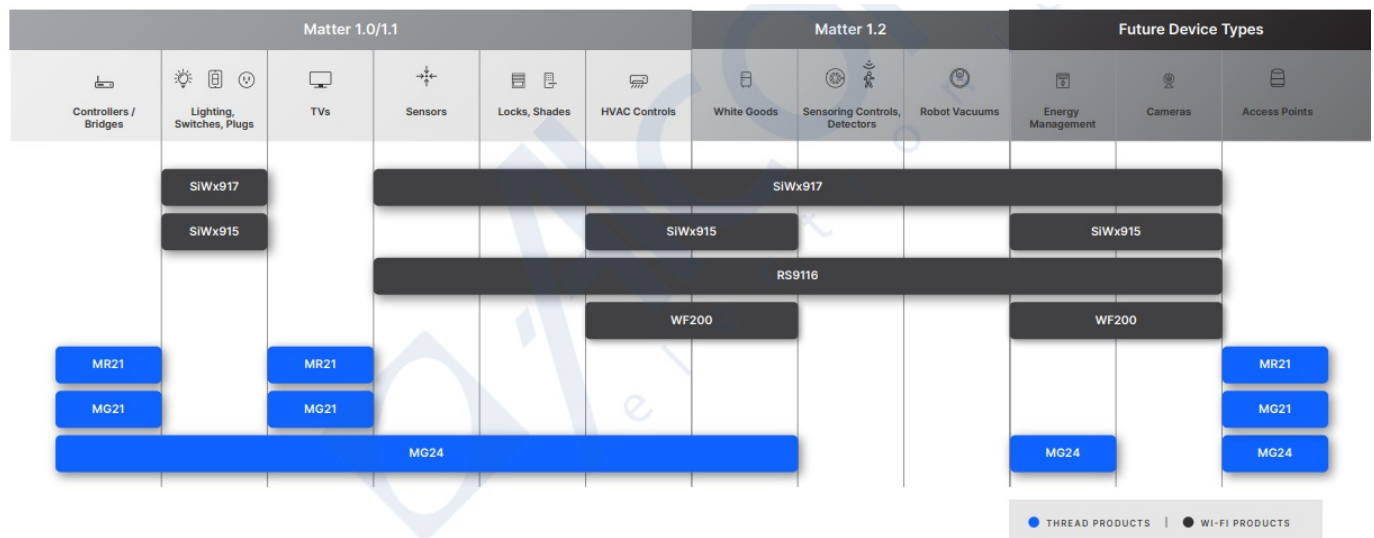
the coprocessor.

This design decision is critical because it will determine the requirements and constraints of both the software and the hardware.

For more information on how to approach this decision, you can read our Software Design Fundamentals User Guide.



## Current and Future Application Support



## Silicon Labs Thread Solutions



Reliable, low-latency, and long-range Thread connectivity for SoC and RCP solutions

- +19.5 dBm output power
- Increased RF sensitivity

## Single-SoC Matter solution

- Integrated Bluetooth LE Co-ex for easy commissioning

## **Matter-compliant security**

- Secure Vault™ High supports the Matter hardware and software security requirements with PSA/SESIP Certification Level 3

## **Higher accuracy for industrial sensors**

- 20-bit ADC for more granular output values

## **Extend product lifetime**

- Large memory facilitating more features, smooth OTA updates, and longer product lifetime  
Reduce BOM and PCB footprint while simplifying design

## **Faster AI/ML processing with lower energy consumption**

- Integrated AI/ML hardware accelerator enables 2-4X faster ML inferencing and up to 6X lower power compared to non-accelerated processors (depends on the algorithm and model)  
Memory – Flash 1536 kB, RAM 256 kB



## **High-performance and reliable Thread RCP solution for Matter gateways**

- +20 dBm output power
- High RF sensitivity

## **Multiprotocol**

- Bluetooth LE co-ex for easy device commissioning
- Zigbee

## **Improved Wi-Fi blocking performance**

- Prevent interference by filtering out Wi-Fi signals

## **Secure Vault™ High**

- The most advanced IoT security with PSA/SESIP Level 3  
Memory — Flash 1024 kB, RAM 96 kB



## **High-performance and reliable Thread RCP solution for Matter gateways**

- +20 dBm output power
- Increased RF sensitivity

## **Multiprotocol**

Bluetooth LE co-ex for easy device commissioning

### **Improved Wi-Fi blocking performance**

- Prevent interference by filtering out Wi-Fi signals

## **Secure Vault™ Mid**

- The most advanced IoT security with PSA/SESIP Level 2

**Memory — Flash 512 kB, RAM 64 kB**



## **Silicon Labs Wi-Fi Solutions**



**Lowest-power Wi-Fi 6 SoC battery-powered devices Minimal battery replacement and recharging hassle for users**

- Always-on cloud connectivity with minimal power
- Doubling the Wi-Fi 6 battery life compared to the nearest competing SoCs

## **Improved user experience with superior wireless performance and easy device commissioning**

- Bluetooth LE co-existence for commissioning

## **Devices, users, and brand are protected from cyber threats**

- Best-in-Class Security for Wi-Fi

## **Fully integrated wireless MCU**

- Dual core with an application-dedicated ARM core
- High memory, PSRAM
- AI/ML, ultra-low-power sensor hub

## **Maximum Wi-Fi gateway compatibility**

- Independently tested
- Reduce user frustration, customer care costs, and improve brand loyalty
- Comprehensive networking stack (TCP/IP, HTTP/HTTPS, MQTT, etc.)



## **Seamless integration with Silicon Labs development solutions**

- Simplicity Studio 5 streamlines the development process, reducing costs and time-to-revenue



### **Energy-efficient Wi-Fi 6 SoC for line-powered devices**

#### **Improve user experience with exceptional wireless performance and easy device commissioning**

- Always-on cloud connectivity
- Wi-Fi 6 for improved connectivity in high-density environments
- Better coverage for devices in every room of the house and beyond (2.4 GHz)
- Bluetooth LE co-ex for easy commissioning

#### **Protect devices, users, brand, and revenue from cyber-threats**

- Best-in-class security for Wi-Fi

#### **Maximum Wi-Fi gateway compatibility, independently tested**

- Reduce user frustration, customer care costs, and improve brand loyalty

## **Seamless integration with Silicon Labs development solutions**

- Simplicity Studio 5 streamlines the development process, reducing cost and time-to-revenue



### **Ultra-low-power for Wi-Fi 4 on battery devices**

- 55  $\mu$ A stand-by associated current at 1 sec

#### **NCP Matter solutions only**

#### **Integrated Bluetooth LE Co-ex for easy commissioning**

#### **High-performance Wi-Fi connectivity**

- +20 dBm TX, -98 dBm RX, 72 Mbps bandwidth with less power than competitors

#### **Maximum Wi-Fi access point compatibility**

- Independently tested across 100s of Wi-Fi access points for exceptional interoperability

#### **Enterprise-level security**

- TLS 1.0, TTLS, PEAP, WPA2/WPA3





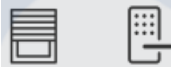

#### **Pre-certified stack by Wi-Fi Alliance**

- Making your end-product certification easier (Est. Q1 2023)

## Comprehensive networking stack

- Offloads the main MCU with TCP/IP (IP v4), SSL 3.0/TLS1.2, HTTP/HTTPS, Web sockets, DHCP, MQTT Client







## Matter 1.0/1.1 Device Types

 <b>Control lers / Bridges</b>	 <b>Lighting, Switch hes, Plugs</b>	 <b>TVs</b>	 <b>Sensors</b>	 <b>ocks, Shade L</b>	 <b>HVAC Controls</b>
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<p><b>MG24</b> High-perf Thread RCP, Bluetooth LE co-ex Low power, long battery life Long-range, +19.5 dBm TX AI/ML High PSA L3 security<b>MG21</b> Thread RCP for gateways Bluetooth LE co-ex &amp; Multiprotocol Long range, +20 dBm TX Low power, long battery life High PSA L3 security<b>MR21</b> Thread RCP for gateways Bluetooth LE co-ex Low power, long battery life Long range, 20 dBm TX Secure Vault Mid</p>	<p><b>SiWx917</b> Single-SoC Matter solution Lowest-power Wi-Fi 6 for battery devices Bluetooth LE co-ex Best Wi-Fi IoT security ULP Sensor Hub <b>SiWx915</b> Single-SoC Matter solution Wi-Fi 6 for line devices Bluetooth LE co-ex Best Wi-Fi IoT security <b>RS9116</b> Lowest power Wi-Fi 4 &amp; Bluetooth LE co-ex for battery devices Matter NCP solution Comprehensive networking stack <b>WF200</b> Low-power Wi-Fi 4 only for battery &amp; line devices Matter RCP solution MCU offload Small 4 x 4 mm <b>MG24</b> Single-SoC Matter/Thread solution Low power, long battery life Long-range, +19.5 dBm TX Bluetooth LE co-ex AI/ML High PSA L3 security High-accuracy ADC</p>	<p><b>MG24</b> High-perf Thread RCP, Bluetooth LE co-ex Long-range, +19.5 dBm TX AI/ML High PSA L3 security<b>MG21</b> Thread RCP for gateways Bluetooth LE co-ex &amp; Multiprotocol Long range, +20 dBm TX High PSA L3 security <b>MR21</b> Thread RCP for gateways Bluetooth LE co-ex Long range, +20 dBm TX Secure Vault Mid</p>	<p><b>SiWx917</b> Single-SoC Matter solution Lowest-power Wi-Fi 6 for battery devices Bluetooth LE co-ex AI/ML Best Wi-Fi IoT security ULP Sensor Hub 16-bit ADC<b>MG24</b> Thread SoC for battery devices Low power, long battery life Long-range, +19.5 dBm TX Bluetooth LE co-ex AI/ML High PSA L3 security High-accuracy ADC</p>	<p><b>SiWx917</b> Lowest-power Wi-Fi 6 for battery devices Single-SoC Matter solution Bluetooth LE co-ex AI/ML Best Wi-Fi IoT security <b>SiWx915</b> Single-SoC Matter solution Wi-Fi 6 for line devices Bluetooth LE co-ex Best Wi-Fi IoT security <b>RS9116</b> Lowest power Wi-Fi 4 &amp; Bluetooth LE co-ex for battery devices Matter NCP solution Comprehensive networking stack <b>WF200</b> Low-power Wi-Fi 4 only for battery &amp; line devices Matter RCP solution MCU offload Small 4 x 4 mm <b>MG24</b> Thread SoC for battery devices Low power, Long battery life Long-range, +19.5 dBm TX Bluetooth LE co-ex AI/ML High PSA L3 security</p>	<p><b>SiWx917</b> Single-SoC Matter solution Lowest-power Wi-Fi 6 for battery devices Bluetooth LE co-ex Best Wi-Fi IoT security ULP Sensor Hub <b>SiWx915</b> Single-SoC Matter solution Wi-Fi 6 for line devices Bluetooth LE co-ex Best Wi-Fi IoT security <b>RS9116</b> Lowest power Wi-Fi 4 &amp; Bluetooth LE co-ex for battery devices Matter NCP solution Comprehensive networking stack <b>WF200</b> Low-power Wi-Fi 4 only for battery &amp; line devices Matter RCP solution MCU offload Small 4 x 4 mm <b>MG24</b> Single-SoC Matter/Thread solution Low power, long battery life Long-range, +19.5 dBm TX Bluetooth LE co-ex AI/ML High PSA L3 security High-accuracy ADC</p>
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- THREAD PRODUCTS
- WI-FI PRODUCTS

## Matter 1.2 Future Device Types

 <b>White Goods</b>	 <b>Robot Vacuums</b>	 <b>Sensing Controls, Detectors</b>	 <b>Energy Management</b>	 <b>Cameras</b>	 <b>Access Points</b>
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## HARDWARE COMPARISON FOR THREAD

**MG24 vs.**

**MG21 vs.**

**MR21**

	MG24	MG21	MR21
Protocol Support	RCP SoC – Dynamic Multiprotocol w/ Bluetooth i Supports OTA with internal flash	Multiprotocol, Proprietary Bluetooth, Thread, and Zigbee (NCI) and S: – Matter (RCP only)	Bluetooth (HCI) OpenThread (RCP multi-PAN) Zigbee (RCP – requires separate license for Zigbee stack) Matter over Thread (RCP multi-PAN • BT HCI)
Frequency Bands	2.4 GHz	2.4 GHz	2.4 GHz
Core	Cortex-M33 (78 MHz)	Cortex-M33 (80 MHz)	Cortex-M33 (80 MHz)
Max Flash	1536 KB	1024 kB	512 kB
Max RAM	256 kB	96 kB	64 kB
Security	Secure Vault Mid Secure Vault High	Secure Vault Mid Secure Vault High	Secure Vault Mid
Rx Sensitivity (15.4)	-105.4 dBm	-104.5 dBm	-104.3 dBm
Rx Sensitivity (Bluetooth LE 1Mbps)	-97.6 dBm	-97.5 dBm	-97.1 dBm
Active Current	33.4 pA/MHz	59.8 pA/MHz	59.7 pA/MHz
Sleep Current (EM2, 16 kB ret)	1.3 pA	4.5 nA	25 pA
TX Current @ +0 dBm (2.4 GHz)	5.0 mA	9.3 mA	9.3 mA
TX Current @ +10 dBm (2.4 GHz)	191 mA	34 mA	60.8 mA (+20 dBm OPN)
TX Current @ +20 dBm (2.4 GHz)	156.8 mA	185 mA	186.5 mA
RX Current (802.15.4)	5.1 mA	9.5 mA	9.5 mA
RX Current (Bluetooth LE 1 Mbps)	4.4 mA	8.8 mA	8.8 mA
Serial Peripherals	USART, EUSART, I2C	USART, I2C	USART
Analog Peripherals	20-bit ADC, ACMP, VDAC	12-bit ADC, ACMP	
Other	Die Temp Sensor	Die Temp Sensor	Die Temp Sens –
Operating Voltage	1.71 to 3.8 V	1.71 to 3.8 V	1.71 to 3.8 V
GPIO	26, 28, 132		
Package	5x5 C1FN40, 6x6 OFN48 12.9x15.0 PCB Module		4 x4 OFN32

**917 vs.  
915 vs.  
RS9116**

Parameter	SiWx917	SiWx915	RS9116
Sampling / In-Production	Sampling now, Q4 2023	Sampling/IP: 01, 2024	di production
RF Bands (GHz)	2.4 GHz	2.4 GHz	2.4 GHz, 5 GHz (Modules)
Wi-Fi Generation / Bandwidth	Wi-Fi 6 / 20 MHz (OFDMA, MU-MIMO, TWT)	Wi-Fi 6 / 20 MHz (OFDMA, MU-MIMO, TWT)	Wi-Fi 4 / 20 MHz
Bluetooth Support	Bluetooth LE 5.1	Bluetooth LE 5.1	ST (SPP, A2DP), Bluetooth LE 5
Modes of Operation	RCP, NCP, SoC	RCP, NCP, SoC	RCP, NCP
Temperature Range	-40 to 105° C	-40 to 85° C	-40 to 85° C
PSRAM, AI/ML	Yes	No	No
Embedded SRAM and FLASH	672 kB and up to 8 MB; opt ext. flash	672 kB and up to 4 MB; opt ext. flash	384 kB and 4 MB
NWP Type / Speed (MHz)	TA-4T / 160 MHz	TA-4T / 160 MHz	TA-4T / 160 MHz
MCU Type / Speed (MHz)	Cortex M4F / 180 MHz	Cortex M4F / 180 MHz	N/A
Security	WPA2/WPA3, SSL/TLS 1.3 PSA-L2 TRNG, PUF, Secure Boot, Secure OTA, Secure Zor. Secure XIP (AES-XTS), Advanced Crypto	WPA2/WPA3, SSL/TLS 1.3 PSA-L2 TRNG, PUF, Secure Boot, Secure OTA, Secure Zone (TEE), Secure XIP (AES-XTS), Advanced Crypto	WPA2/WPA3, SSL/TLS 1.2
Max GPIO (GPIO Multiplexer)	46	22	N/A
IC Pkg	7x7 QFN84, PCB Module	6x6 QFN52, PCB Module	7x7 QFN84, SiP and PCB Modules
WLAN Max Tx Power / Rx Sens	21 dBm / -98 dBm	21 dBm / -98 dBm	20 dBm / -98 dBm
Power Modes	Ultra-Low-Power	Low-Power	Ultra-Low-Power
Target Applications	Door Locks, HVAC, Portable Medical, Sensors, Cameras, Switches, Power Tools, Asset Monitoring, Fleet Management, Clinical Medical, Metering	Appliances, HVAC, Portable Medical, Cameras, Switches, Power Tools, Asset Monitoring, Fleet Management, Clinical Medical, Metering	Speakers, Door Locks, HVAC, Portable Medical, Wear-ables, Power Tools, Asset Monitoring, Fleet Management, Clinical Medical

## Solutions for All Matter Use-Cases

Development solutions for all Matter use-cases:

- Matter over Wi-Fi
- Matter over Thread



- OpenThread Border Routers
- Matter Bridge for Zigbee and Z-Wave



## Solutions for Matter Over Thread

### Pro Kit

EFR32xG24

Pro Kit with the MG24 SoC and BRD4187C Radio Board is THE development tool for Matter innovators! All tools for developing wireless applications. Enhance with Add-on radio boards!



### Dev Kit

EFR32xG24

A small, cost-effective, and feature-rich development kit based on the MG24 SoC for prototyping and experimenting with energyfriendly Matter devices; supports Qwik and Ada Fruit boards



[Learn More](#)

### Explorer Kit

EFR32xG24

An ultra-low-cost board for rapid Matter prototyping and concept creation on the MG24 SoC



[Learn More](#)

### Solutions for Matter Over Thread

Pro Kit Add-Ons

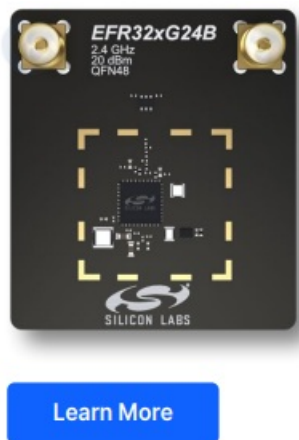
#### Radio Board

+10 dBm EFR32xG24 Wireless 2.4 GHz Works with the MG24 Pro Kit; supports Bluetooth LE, Thread, Matter, and other protocols



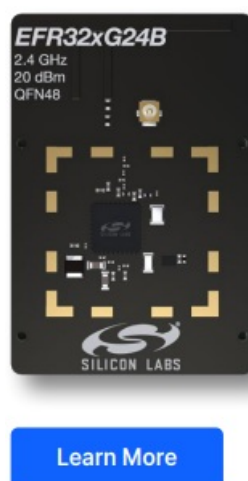
### Antenna Diversity

+20 dBm EFR32xG24 Wireless 2.4 GHz Established for antenna diversity development; designed for managing multipath fading on the MG24 Pro Kit (includes reference)



### Radio Board

+20 dBm EFR32xG24 Wireless 2.4 GHz Works with the MG24 Pro Kit to support Bluetooth LE, Thread, Matter, and other protocols



### Solutions for Matter Over Wi-Fi

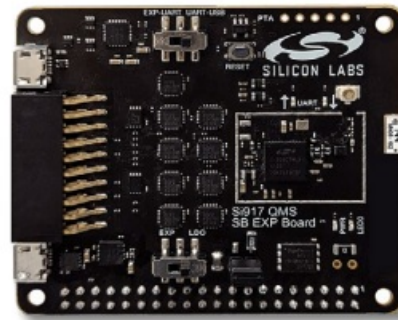
#### SiWx917 Dev Kit for SoC Mode

Radio board with SiWx917 that plugs into the Pro Kit baseboard; radio board provides access to the SiWx917 MCU peripherals and the internal application MCU for development using Simplicity Studio IDE and Debugger



### SiWx917 Dev Kit for NCP/RCP Modes

For RCP and NCP hosted modes of operation, the expansion board plugs into an existing EFR32MG24 Pro Kit to enable the development of hosted applications, including Matter on the MG24



### RS9116X EVK2 Wi-Fi + Bluetooth Dev Kit

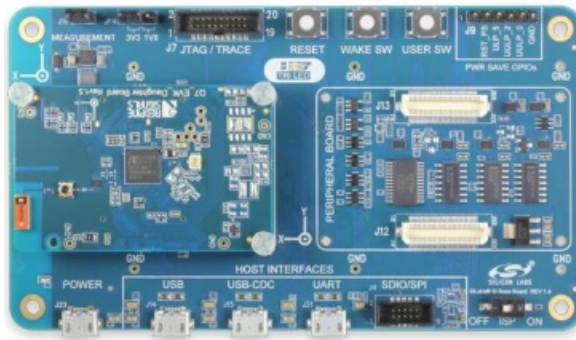
Works with the MG24 Pro Kit; supports Bluetooth LE, Thread, Matter, and other protocols



[Learn More](#)

### RS9116X EVK1 Wi-Fi + Bluetooth Dev Kit

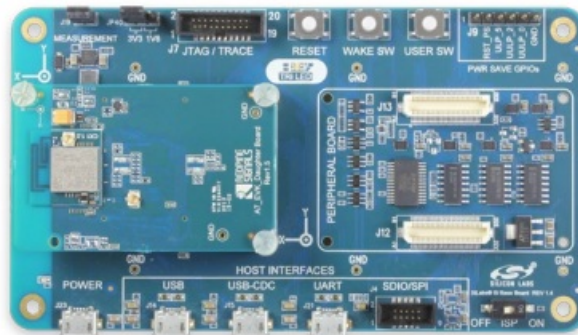
Established for antenna diversity development; designed for managing multipath fading on the MG24 Pro Kit (includes reference)



[Learn More](#)

### **RS9116X Dual Band Wi-Fi + Bluetooth Development Kit (CC1 Module)**

Supports Dual Band Wi-Fi 4 802.11 a/b/g/n on the 2.4 & 5 GHz bands and dual-mode Bluetooth, allowing designers to develop applications for the RS9116 CCx modules



[Learn More](#)

### **SLEXP8022C – WF200 Wi-Fi Expansion Kit with Raspberry Pi**

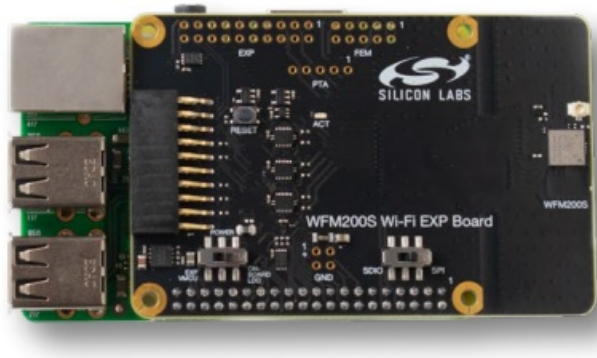
Allows development on the WF200 Series of Wi-Fi Transceiver SoCs; includes a built-in Raspberry Pi Connector to get started immediately with Linux development and an EXP Connector to enable development on Silicon Labs' MCUs and Wireless MCUs



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### **SLEXP8023C – WFM200S Wi-Fi Expansion Kit with Raspberry Pi**

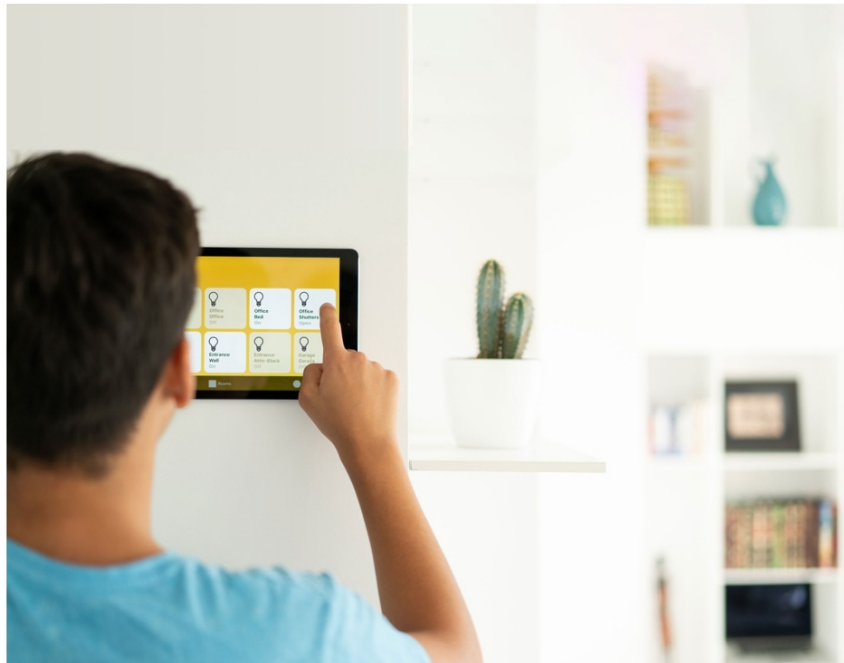
Enables development for the WFM200S Wi-Fi Transceiver modules



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## About Silicon Labs

Silicon Labs is the leading provider of silicon, software, and solutions for a smarter, more connected world. Our industry-leading wireless solutions feature a high level of functional integration. Multiple complex mixed-signal functions are integrated into a single IC or system-on-chip (SoC) device, saving valued space, minimizing overall power consumption requirements, and improving products' reliability. We are the trusted partner for the worldleading consumer and industrial brands. Our customers develop solutions for a wide range of applications, from medical devices to smart lighting to building automation, and much more.



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## Documents / Resources



### [SILLICON LABS Matter SoC and Module](#) [pdf] Instructions

MG24, MG21, MR21, 917, 915, RS9116, Matter SoC and Module, Matter SoC, Matter Module, SoC Module, Module

## References

- [Alcom electronics | Home](#)
- [Alcom electronics | Home](#)
- [User Manual](#)

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